

# N3786 & N3586 SERIES

**Digital POTS Telephone and Modem Interface** 

**User Manual** 

Infinova

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#### SERVICE NOTICE

The installation of this product should be made by qualified personnel. Do not attempt to service this product yourself. Refer all servicing to qualified personnel.

If you require information during installation of this product or if service seems necessary, contact the local suppliers or Infinova at 1-732-355-9100 in 51 Stouts Lane, Monmouth Junction, NJ 08852 U.S.A. You must obtain a Return Authorization Number and shipping instructions before returning any product for service.

Our obligation under this warranty is limited only to the repair or replacement of any of our products, provided that products are used within the specified ratings and applications, and that products are applied in accordance with good engineering practices, and that products are proved by our examination to be defective.

This warranty does not extend to any Infinova products which have been subject to acts of accident, misuse, abuse, neglect, improper application or installation, improper operation or maintenance, connection to an improper voltage supply or to materials which have been altered or repaired outside an authorized Infinova factory repair center.

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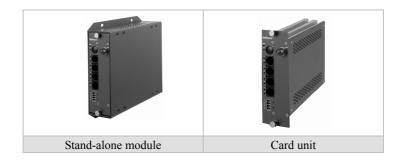
TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS PRODUCT TO RAIN OR MOISTURE.

DO NOT LOOK INTO OPTICAL PORTS WITH POWER ON.

#### PRODUCT DESCRIPTION

#### Description

The N3786 and N3586 series provide high quality reliable transmission of digitally encoded POSTS Telephone and one bi-directional data over one or two optical fibers. N3786XA / XB shall convert one Telephone audio from source to Digitally Encoded light to transmit on fiber. N3786XA is compatible with N3786XB-M modules and N3786XB-R card units. Plug-and-play design ensures ease of installation requiring no electrical or optical adjustments. Each transmitter or receiver incorporates status indicators for monitoring of proper system operation. The modules are available in either stand-alone or card unit transmitter versions.



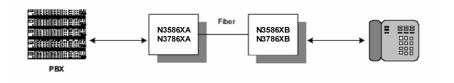
The N3786 series are compatible with 9/125micron single-mode fibers; the N3586 series are compatible with 50/125 or 62.5/125micron multimode fibers.

# Accessories (optional)

N3910-000 19" 1U fan assembly unit

N3951 Fiber optical transmission repeater

# System Diagram





Use the Configuration chart below to select the options available for this product.

#### Note:

The transmission distance category is valid for single-mode product only.

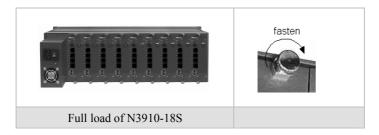
#### INSTALLATION

#### Installation of Series POTS Telephone and Modem Interface

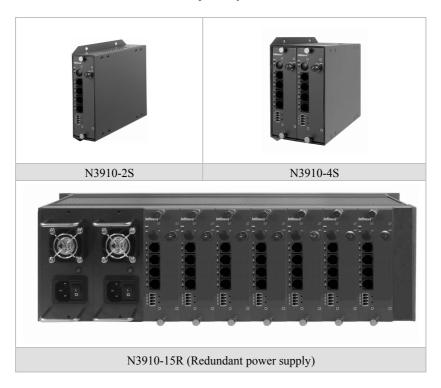
To install the apparatus, it is necessary to allow enough space to accommodate the bend radius of the optical cable connected to it. Series POTS Telephone and Modem Interface input/output use RJ11 connector and 4-pin terminal block connector of the data.

#### Installation of card unit

Push the card unit along the guide rails (not in spaces between the rails). There is an Infinova logo on the front panel indicating the proper orientation. Press hard to make good connection to motherboard - loud snap indicates firm connection. There are two captive screws on the front panel that can fasten the card unit to the subrack. They must be locked by hand in a clockwise manner (do not over tighten), see figure right below.



There are 18 slots on N3910-18S. So it can mount 18 pieces of card unit. Besides N3910-18S, there are N3910-1S, N3910-2S, N3910-3S, N3910-4S and N3910-15R optional. There are 1 slot on N3910-1S, 2 slots on N3910-2S, 3 slots on N3910-3S, 4 slots on



#### **WARNING:**

A FULL LOAD OF N3910-15R AND N3910-18S SUBRACK REQUIRES FORCED AIR COOLING IN THE RACK. TO AVOID OVER HEATING OF CARD UNITS, WHENEVER POSSIBLE, INSTALL IN EVERY OTHER SUBRACK.

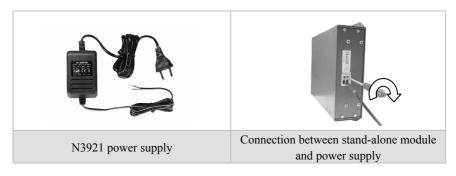


#### Power supply for card unit

The unit is powered by a plug-in power supply that is provided with the appropriate desk chassis or EIA 19" subrack.

#### Power supply for stand-alone module

The card unit can be converted into a stand-alone module when installing into a 2-slot chassis N3910-2S that is powered by a plug-in 24VAC@1A (N3921-24AC-1 for 110V; N3921-24AC-2 for 220V; N3921-24AC-3 for 230V) or 12VDC@1A (N3921-12DC-1 for 110V; N3921-12DC-2 for 220V; N3921-12DC-3 for 230V) power supply. Plug the wires into the connectors, fasten the screws to make a firm connection, see figure below.



When the series is powered together with other devices (cameras and etc.) by a single 24VAC power source, please make sure that the related device has a full-wave (bridge) rectifier circuit.

#### 1-ch POTS Line Interface

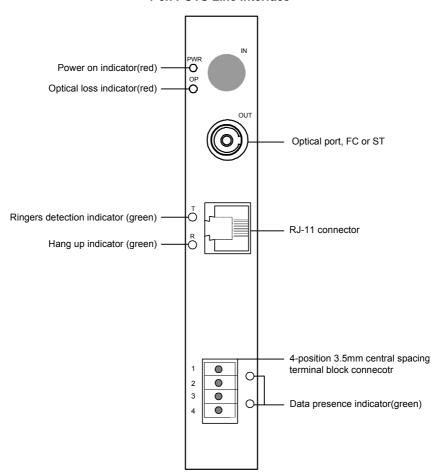


Figure 1. Panel for N3586XA & N3786XA

# 1-ch POTS Telephone Interface

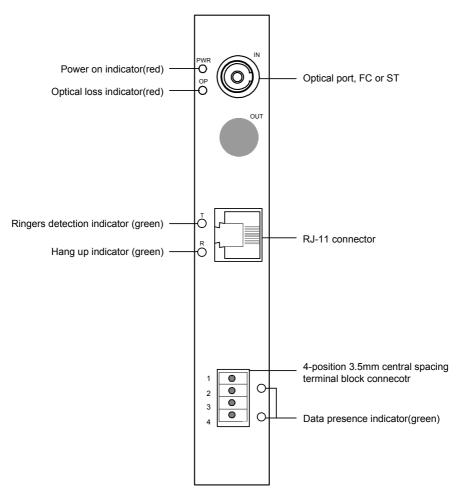


Figure 2. Panel for N3586XB & N3786XB

## 4-ch POTS Line Interface

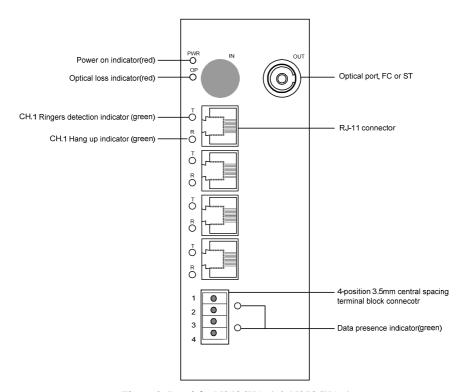


Figure 3. Panel for N3586XA-4 & N3786XA-4

# **4-ch POTS Telephone Interface**

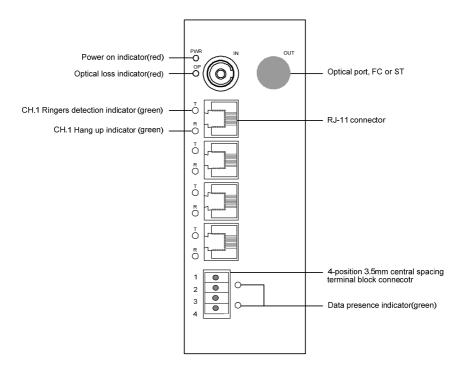


Figure 4. Panel for N3586XB-4 & N3786XB-4

## 8-ch POTS Line Interface

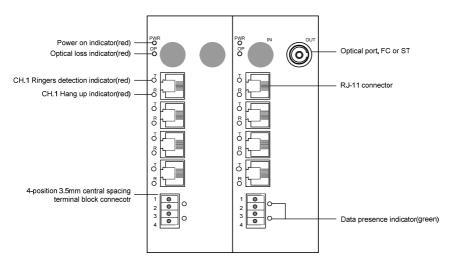


Figure 5. Panel for N3586XA-8 & N3786XA-8

# 8-ch POTS Telephone Interface

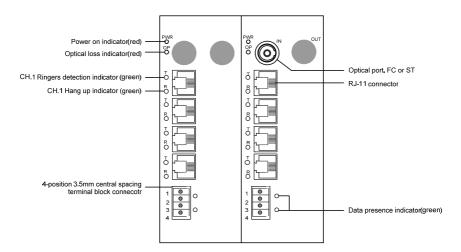


Figure 6. Panel for N3586XB-8 & N3786XB-8

Jumper of JP2 on N3786 is to enable/disable line termination resistor. Set JP2 with jumper cap is to connect  $120\Omega$  termination resistor between Pin3 and Pin 4. DIP switch of DIP-1 and DIP-2 are to set the data format; they must be identical on both transmitter and receiver for specified data format. See table 1 for more details.

#### **Termination resistor**

A multipoint bus architecture requires termination at both ends of the bus line to restrain signal reflection. The termination resistors must be within 20 percent of the characteristic impedance of the cable and can vary from 90  $\Omega$  to 120  $\Omega$ .

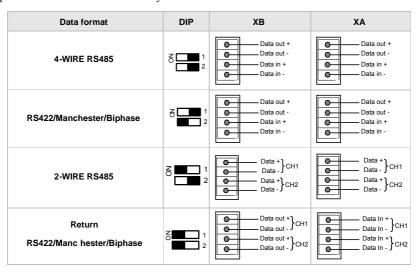
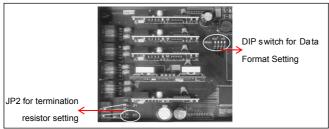


Table 1. DIP SWITCH SETTING REFERENCE

# Location of DIP switch and Jumper:



For the detailed location of the DIP switch on transceiver, please refer to TRANSMITTER PANEL and RECEIVER PANEL

#### Telephone Telephone Switch System 4-PIN CONNECTOR 4-PIN CONNECTOR 1#: CH.1 MANCHESTER IN+/ 2-wire RS485 D+ 1#: CH.1 MANCHESTER OUT+/ 2-wire RS-485 D+ OR RS-422 / 4-wire RS-485 OUT+ 2#. CH.1 MANCHESTER OUT-/ 2-wire RS-485 D-OR RS-422 / 4-wire RS-485 OUT+ 0 2#: CH.1 MANCHESTER IN-/ 2-wire RS-485 D-OR RS-422 / 4-wire RS-485 OUT-OR RS-422 / 4-wire RS-485 OUT-3#. CH.2 MANCHESTER IN+/ 2-wire RS-485 D+ 3#: CH 2 MANCHESTER OUT+/ 2-wire RS-485 D+ OR RS-422/4-wire RS-485 IN+ 4#: CH.2 MANCHESTER OUT-/2-wire RS-485 D-OR RS-422 / 4-wire RS-485 IN+ 4#: CH.2 MANCHESTER IN/ 2-wire RS-485 D-OR RS-422/4-wire RS-485 IN-OR RS-422 / 4-wire RS-485 IN-INSIDE 4-POSITION DIP SWITCH INSIDE 4-POSITION DIP SWTCH DIPLY OFF 8 DIPLY OFF: 1-C Aver full duples RS-485 available DIPLY ON 8 DIPLY OFF: 1-C Aver balf duples RS-485 (default setting) DIPLY ON 8 DIPLY ONF: 2-C Aver balf duples RS-485 (default setting) DIPLY ON 8 DIPLY ONF: 2-C Aver balf duples RS-485 (default setting) DIPLY ON 8 DIPLY ONF: 1-C Aver balf duples RS-485 (default setting) DIPLY ONF: NA

#### 1-ch POTS Telephone Line Interface

N3786XA N3786XB

Figure 7. 1-ch POTS Telephone Line Interface

#### Note:

- 1. Don't connect N3786XA and N3786XB in reverse.
- 2. Set JP2 with jumper cap is to connect  $120\Omega$  termination resistor between Pin3 and Pin4.

#### O OP O Ô Ô 9 [J Ò Ô Ĉ ō Q Ô Telephone Telephone Switch System ŏ Q 4-PIN CONNECTOR 4-PIN CONNECTOR 1#: CH.1 MANCHESTER IN+/ 2-wire RS-485 D+ OR RS-422 / 4-wire RS-485 OUT+ 0 0 2 0 1#: CH.1 MANCHESTER OUT+/ 2-wire RS-485 D+ OR RS-422 / 4-wire RS-485 OUT+ 2#: CH.1 MANCHESTER OUT-/ 2-wire RS-485 D-0 3 0 2#: CH.1 MANCHESTER IN-/ 2-wire RS-485 D-OR RS-422 / 4-wire RS-485 OUT-0 0 0 3 OR RS-422 / 4-wire RS-485 OUT-0 3#: CH.2 MANCHESTER IN+/ 2-wire RS-485 D+ 3#: CH.2 MANCHESTER OUT+/2-wire RS-485 D+ OR RS-422/4-wire RS-485 IN+ 4#: CH.2 MANCHESTER OUT-/2-wire RS-485 D-OR RS-422 / 4-wire RS-485 IN-OR RS-422 / 4-wire RS-485 IN-OR RS-422 / 4-wire RS-485 IN-OR RS-422 / 4-wire RS-485 IN INSIDE 4-POSITION DIP SWITCH DIP-1 OFF & DIP-2 OFF : 1- ch 4-wire full duplex RS-485 available DIP-1 OFF & DIP-2 ON : 1-ch RS-422 data available DIP-1 ON & DIP-2 OFF: 2- ch 2-wire half duplex RS-485 (default setting) DIP-1 ON & DIP-2 ON: 2- ch return Manchester data

#### 4-ch POTS Telephone Line Interface

Figure 8. 4-ch POTS Telephone Line Interface

N3786XB-4

#### Note:

1. Don't connect N3786XA and N3786XB in reverse.

N3786XA-4

2. Set JP2 with jumper cap is to connect  $120\Omega$  termination resistor between Pin3 and Pin4.

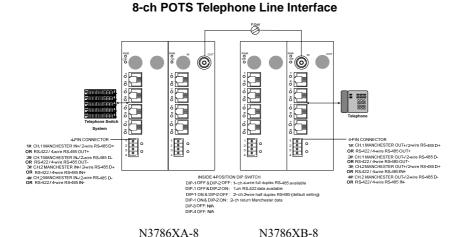


Figure 9. 8-ch POTS Telephone Line Interface

#### Note:

- 1. Don't connect N3786XA and N3786XB in reverse.
- 2. Set JP2 with jumper cap is to connect  $120\Omega$  termination resistor between Pin 3 and Pin4.

#### TRANSMISSION REPEATER

The N3951 series is used between transmitter and receiver to extend the transmission distance of fiber optical system. It magnifies the optical signal received from transmitter, and sends it to receiver. By using a N3951, the transmission distance of the system is doubled.

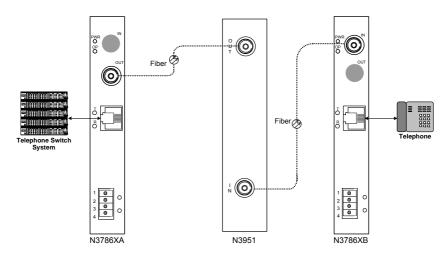


Figure 10. Transmission repeater

#### Relation between 24VAC Cable Diameter and Transmission Distance

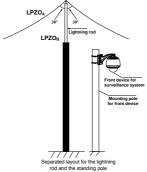
In general, the maximum allowable voltage loss rate is 10% for AC-powered devices. The table below shows the relationship between transmission power and maximum transmission distance under a certain specified cable diameter, on condition that the 24VAC voltage loss rate is below 10%. According to the table, if a device rated at 50W is installed 17-meter away from the transformer, the minimum cable diameter shall be 0.8000mm. A lower diameter value tends to cause voltage loss and even system instability.

| Diameter (mm) Power (W) | 0.8000   | 1.000     | 1.250     | 2.000      |
|-------------------------|----------|-----------|-----------|------------|
| 10                      | 283 (86) | 451 (137) | 716 (218) | 1811 (551) |
| 20                      | 141 (42) | 225 (68)  | 358 (109) | 905 (275)  |
| 30                      | 94 (28)  | 150 (45)  | 238 (72)  | 603 (183)  |
| 40                      | 70 (21)  | 112 (34)  | 179 (54)  | 452 (137)  |
| 50                      | 56 (17)  | 90 (27)   | 143 (43)  | 362 (110)  |
| 60                      | 47 (14)  | 75 (22)   | 119 (36)  | 301 (91)   |
| 70                      | 40 (12)  | 64 (19)   | 102 (31)  | 258 (78)   |
| 80                      | 35 (10)  | 56 (17)   | 89 (27)   | 226 (68)   |
| 90                      | 31 (9)   | 50 (15)   | 79 (24)   | 201 (61)   |
| 100                     | 28 (8)   | 45 (13)   | 71 (21)   | 181 (55)   |
| 110                     | 25 (7)   | 41 (12)   | 65 (19)   | 164 (49)   |
| 120                     | 23 (7)   | 37 (11)   | 59 (17)   | 150 (45)   |
| 130                     | 21 (6)   | 34 (10)   | 55 (16)   | 139 (42)   |
| 140                     | 20 (6)   | 32 (9)    | 51 (15)   | 129 (39)   |
| 150                     | 18 (5)   | 30 (9)    | 47 (14)   | 120 (36)   |
| 160                     | 17 (5)   | 28 (8)    | 44 (13)   | 113 (34)   |
| 170                     | 16 (4)   | 26 (7)    | 42 (12)   | 106 (32)   |
| 180                     | 15 (4)   | 25 (7)    | 39 (11)   | 100 (30)   |
| 190                     | 14 (4)   | 23 (7)    | 37 (11)   | 95 (28)    |
| 200                     | 14 (4)   | 22 (6)    | 35 (10)   | 90 (27)    |

#### **Lightning & Surge Protection**

The product adopts multi-level anti-lightning and anti-surge technology integrated with gas discharge tube, power resistor and TVS tube. The powerful lightning and surge protection barrier effectively avoids product damage caused by various pulse signals with power below 4kV, including instantaneous lightning, surge and static. However, for complicated outdoor environment, refer to instruction below for lightning and surge protection:

- The product features with dedicated earth wire, which must be firmly grounded. As for surveillance sites beyond the effective protection scope, it's necessary to erect independent lightening rods to protect the security devices. It's recommended to separate the lightning rod from the mounting pole, placing the rod on an independent pole, as shown in the figure below. If the product has to be installed on the same pole or pedestal for lightning rod, there should be strict insulation between the video cable BNC terminal, power cable, control cable and the standing pole of the lightning rod.
- For suburb and rural areas, it's recommended to adopt direct burial for the transmission cables. Overhead wiring is prohibited, because it's more likely to encounter lightning strike. Use shielded cables or thread the cables through metal tubes for burial, thus to ensure the electric connection to the metal tube. In case it's difficult to thread the cable through the tube all the way, it's acceptable to use tube-threaded cables only at both ends of the transmission line, yet the length in burial should be no less than 15 meters. The cable sheath and the tube should be connected to the lightning -proof grounding device.
- Additional high-power lightning-proof equipment and lightning rods should be installed for strong thunderstorm or high induced voltage areas (such as high-voltage substation).
- The lightning protection and grounding for outdoor devices and wires should be designed in line with the actual protection requirement, national standards and industrial standards.
- The system should perform equipotential grounding by streaming, shielding, clamping and earthing. The grounding device must meet anti-interference and electric safety requirements. There should be no short-circuiting or hybrid junction between the device and the strong grid. Make sure there's a reliable grounding system, with grounding resistance below  $4\Omega$  (below  $10\Omega$  for high soil resistivity regions). The cross-sectional area of the earthing conductor should be no less than  $25\text{mm}^2$ .



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